We will begin shortly after 5:00 to allow time for people to load the necessary software for the webinar. While you are waiting for the webinar to begin, solve the following problems. Use multiple representations to solve each problem if possible.

a) 6 x 8

b) 14 x 26

c) 2.3 x 0.4

You need three documents for today's webinar. You should have received them via email. If you did not, you can go to:
www.tinyurl.com/mtifollowup
Scroll down until you see the light blue row of the spreadsheet
- Click on multiplication models and print
- Click on multiplication progression standards and print
- Click on the context cards for multiplication progression and print

OR email
gwynethhughes@boisestate.edu

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3rd – 6th Grade Multiplication Progression

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Presenter

- Jackie Ismail
  - Regional Math Specialist
    - Region III and IV
  - jacquelynismail@boisestate.edu

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Overview

- Multiplication in the current Idaho State Standards and the Common Core Standards
- Create 3-6 Multiplication Progression
- Discuss progression
- Add context to the progression
- Connections to future mathematics and MTI course

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Standards Names/Definitions

- The standards that have been in place for the past several years and are currently being assessed on ISAT will be referred to as the ***current Idaho State Standards***.
- The new standards (adopted in spring 2011 for implementation in fall 2013) will be referred to as the ***Common Core State Standards***

Timeline for implementation of the Common Core State Standards & Smarter Balance Assessment

http://www.k12.wa.us/smarter/

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Domain Progressions in the CCCSS

K	1	2	3	4	5	6	7	8
Counting and Cardinality								
Number and Operations in Base Ten						Ratios and Proportional Relationships		
			Number and Operations – Fractions			The Number System		
Operations and Algebraic Thinking**						Expressions and Equations		
							Functions	
Geometry								
Measurement and Data*						Statistics and Probability		

* K-5 Measurement and Data splits into Statistics and Probability and Geometry in Grade 6

**Operations and Algebraic Thinking is foundation for Grade 6 Expressions and Equations and The Number System

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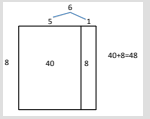
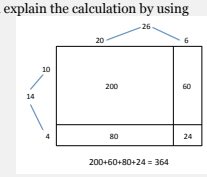
	Current Idaho SS Models		Common Core SS Models
3rd grade	**3.M.1.2.4** Multiply whole numbers through 10 x 10. **Problem:** 6 x 8	**Model:** 6 x 8 =48	**3.OA.3** – Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays and measurement quantities **Problem: 6 x 8** **Potential Models for instruction:** Array, ratio table, 6 x 8 =48  **3.OA.7** - Fluently multiply within 100. By the end of Grade 3, know from memory all products of two one-digit numbers.
4th grade	**4.M.1.2.3** Multiply up to two-digit by two-digit whole numbers and divide whole numbers by one-digit divisors. **Problem:** 26 x 14	**Model:** 26 X 14 104 +260 364	**4.NBT.5** - Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations **Problem:** 26 x 14 **Potential Models for instruction:** area model, ratio table, partial products 1 | 2 | 4 | 10 | 14 26 | 52 | 104 | 260 | 364  200+60+80+24 = 364
5th grade	**5.M.1.2.3** Multiply and divide whole numbers **Problem:** 26 x 14	**Model:** 26 X 14 104 +260 364	**5.NBT.5** - Fluently multiply multi-digit whole numbers using the standard algorithm. **Problem:** 26 x 14 **Potential Models for Instruction:** traditional algorithm 26 X 14 104 +260 364 **5th grade also includes decimals which will be addressed in the webinar.**

Creating the progression

1. Vertically lay out standards for 3rd-6th grade with 3rd on the bottom and 6th on the top.

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6th Grade: • 6.NS.3 - Fluently multiply multi-digit decimals using the standard algorithm
5th Grade: • 5.NBT.5 - Fluently multiply multi-digit whole numbers using the standard algorithm. • 5.NBT.7 – multiply decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations; relate the strategy to a written method and explain the reasoning used
4th Grade: • 4.NBT.5 - Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations
3rd Grade: • 3.OA.3 – Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays and measurement quantities . . . • 3.OA.5 – Apply properties of operations as strategies to multiply and divide. • 3.OA.7 - Fluently multiply within 100. By the end of Grade 3, know from memory all products of two one-digit numbers.

Creating the progression

1. Vertically lay out standards for 3rd-6th grade with 3rd on the bottom and 6th on the top.
2. Sort the cards by grade level paying attention to the models and number sets.

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Creating the progression

1. Vertically lay out standards for 3rd-6th grade with 3rd on the bottom and 6th on the top.
2. Sort the cards by grade level paying attention to the models and number sets.
3. Thinking of moving from informal to formal strategies try to order the models within each grade level.
   – You may see more than one branch in the progression at each grade level as different informal strategies/ models may lead to a different way of thinking and therefore bridge to different formal models/strategies

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6th Grade:
- 6.NS.3 - Fluently multiply multi-digit decimals using the standard algorithm

5th Grade:
- 5.NBT.5 - Fluently multiply multi-digit whole numbers using the standard algorithm.
- 5.NBT.7 – multiply decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations; relate the strategy to a written method and explain the reasoning used

4th Grade:
- 4.NBT.5 - Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations

3rd Grade:
- 3.OA.3 – Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays and measurement quantities . . .
- 3.OA.5 – Apply properties of operations as strategies to multiply and divide.
- 3.OA.7 - Fluently multiply within 100. By the end of Grade 3, know from memory all products of two one-digit numbers.

Models that fit standards will go here

We may see two branches within a grade level

Informal →

Informal →

6th Grade:
- 6.NS.3 - Fluently multiply multi-digit decimals using the standard algorithm

5th Grade:
- 5.NBT.5 - Fluently multiply multi-digit whole numbers using the standard algorithm.
- 5.NBT.7 – multiply decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations; relate the strategy to a written method and explain the reasoning used

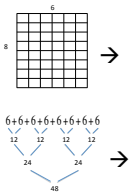
4th Grade:
- 4.NBT.5 - Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations

3rd Grade:
- 3.OA.3 – Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays and measurement quantities . . .
- 3.OA.5 – Apply properties of operations as strategies to multiply and divide.
- 3.OA.7 - Fluently multiply within 100. By the end of Grade 3, know from memory all products of two one-digit numbers.

Models that fit standards will go here

We may see two branches within a grade level

Informal →



Informal →

Looking at the progression

- We will look at each grade level to discuss how the progression of models within the grade level meet the standard(s).

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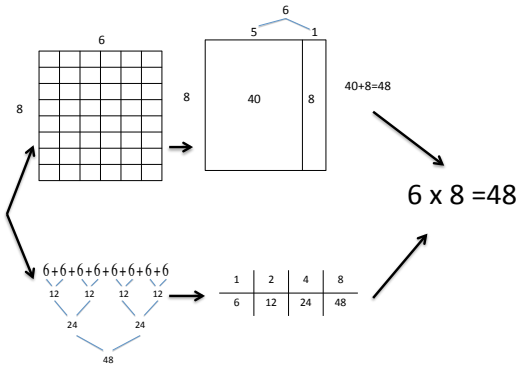
3rd grade

3rd Grade:
- 3.OA.3 – Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays and measurement quantities . . .
- 3.OA.5 – Apply properties of operations as strategies to multiply and divide.
- 3.OA.7 - Fluently multiply within 100. By the end of Grade 3, know from memory all products of two one-digit numbers.



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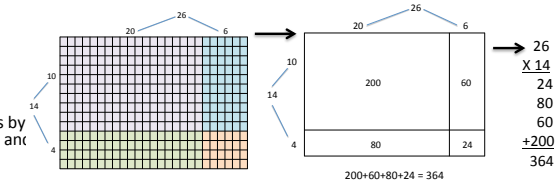
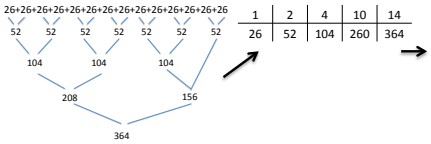
4th grade

4th Grade:

- 4.NBT.5 - Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations



26
X 14
24
80
60
+200
364



1	2	4	10	14
26	52	104	260	364

26 x 14

10 x 26 = 260
2 x 26 = 52
2 x 26 = 52

260+52+52 = 364

5th grade

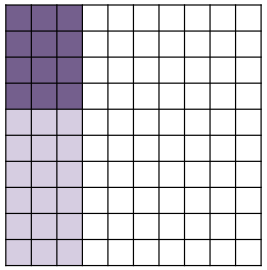
5th Grade:

- 5.NBT.5 - Fluently multiply multi-digit whole numbers using the standard algorithm.

2
26
X 14
104
+260
364

5th grade → building up to the problem

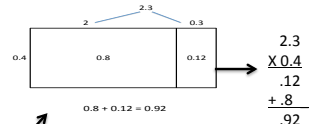
0.4 x 0.3



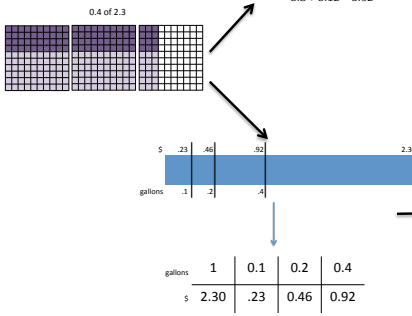
5th grade

5th Grade:

- 5.NBT.7 – multiply decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations; relate the strategy to a written method and explain the reasoning used



2.3
X 0.4
.12
+ .8
.92



2.3 x 0.4

2.3 x 2 = 4.6
2.3 x 4 = 9.2
2.3 x 0.4 = 0.92

gallons	1	0.1	0.2	0.4
$	2.30	.23	0.46	0.92

6th grade

6th Grade:

- 6.NS.3 - Fluently multiply multi-digit decimals using the standard algorithm

$$\begin{array}{r} {\scriptstyle 1}\\ 2.3\\ \underline{\times\ 0.4}\\ .92 \end{array}$$

Adding context to the progression

- Take your context cards and place them next to the model(s) in the progression that would be driven by each context.

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How can the different contextual situations help with the progression?

- Different context can lead to different ways of thinking about the mathematics, which can lead to different branches of the progression.

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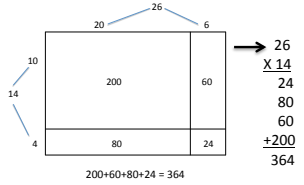
Why is each branch of the progression important?

- Partial Products:
  - Traditional algorithm
  - Computation
  - Decompose numbers



- Ratio Table:
  - Multiplicative thinking
  - Composing number
  - Multiplication as scaling
  - Ratio and proportion for Middle School

1	2	4	10	14
26	52	104	260	364

26 x 14

10 x 26 = 260

2 x 26 = 52

2 x 26 = 52

260+52+52 = 364

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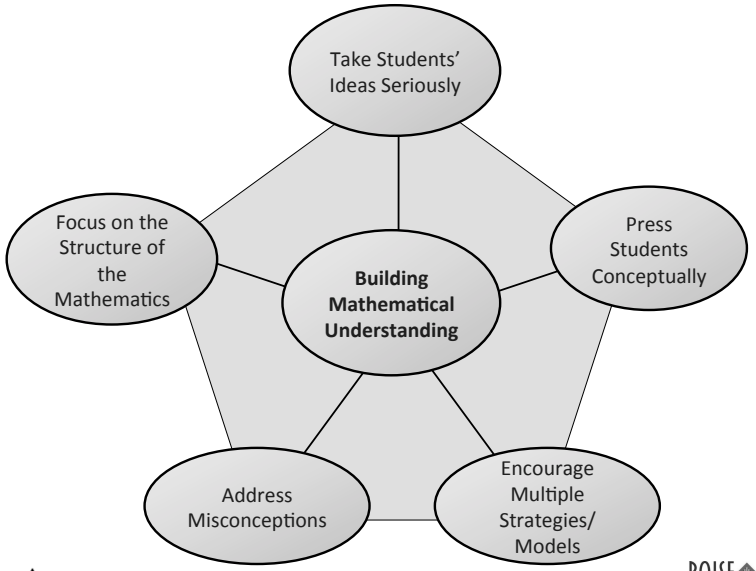

1 Credit Opportunity

- Duration: Accumulate 15 hours of webinar training, live or archived. Additional webinars will be developed and offered during the Fall of 2012. The credit will be earned the semester the 15 hours is completed.
- Registration: Upon completion of the 15 hours, a participant will register with BSU for the one professional education credit.
- Documentation: Completion of a brief webinar summary and reflection for each webinar is required.
- Cost: $65
- Note: The one professional education credit earned for completion and payment of $65, does not count towards the three credits earned with completion of the MTI course. The webinars are follow-up support after completion of the MTI course.
- Information: http://www.sde.idaho.gov/site/math/mti.htm
- Questions: Nichole Hall nhall@sde.idaho.gov

Thank you for attending the webinar!

- Questions
- Contact Information
  - Jackie Ismail jacquelynismail@boisestate.edu
- DMT Website- http://dmt.boisestate.edu
- Follow Up Opportunities: http://www.tinyurl.com/mtifollowup